7059

# 7059

## MEDIUM-MU TRIODE—SHARP-CUTOFF PENTODE

9-PIN MINIATURE TYPE

*For use in mobile communications equipment operating from 6-cell storage-battery systems*

### GENERAL DATA

**Electrical:**

Heater, for Unipotential Cathodes:

| | | |
|---|---|---|
| Voltage range | 12 to 15 | ac or dc volts |
| Current (Approx.) at 13.5 volts | 0.195 | amp |

Direct Interelectrode Capacitances:

| | *Without External Shield* | *With External Shield*° | |
|---|---|---|---|
| *Triode Unit:* | | | |
| Grid to plate | 1.7 | 1.7 | μμf |
| Grid to cathode and heater | 2.7 | 2.7 | μμf |
| Plate to cathode and heater | 0.4 | 1 | μμf |
| *Pentode Unit:* | | | |
| Grid No.1 to plate | 0.01 max. | 0.006 max. | μμf |
| Grid No.1 to all other electrodes except plate | 5 | 5 | μμf |
| Plate to all other electrodes except grid No.1 | 2.5 | 3.4 | μμf |
| Heater to cathode (Each unit) | 3 | 3• | μμf |

**Characteristics, Class $A_1$ Amplifier:**

| | *Triode Unit* | *Pentode Unit* | |
|---|---|---|---|
| Heater Voltage | 13.5 | 13.5 | volts |
| Plate-Supply Voltage | 150 | 250 | volts |
| Grid-No.2 (Screen-Grid) Supply Voltage | – | 110 | volts |
| Cathode Resistor | 56 | 68 | ohms |
| Amplification Factor | 40 | – | |
| Plate Resistance (Approx.) | 4700 | 400000 | ohms |
| Transconductance | 8500 | 5200 | μmhos |
| Plate Current | 18 | 10 | ma |
| Grid-No.2 Current | – | 3.5 | ma |
| Grid-No.1 Voltage (Approx.) for plate μa = 10 | –12 | –10 | volts |

**Mechanical:**

| | |
|---|---|
| Operating Position | Any |
| Maximum Overall Length | 2-3/16" |
| Maximum Seated Length | 1-15/16" |
| Length, Base Seat to Bulb Top (Excluding tip) | 1-9/16" ± 3/32" |
| Diameter | 0.750" to 0.875" |
| Dimensional Outline | *See General Section* |

°,•: See next page.

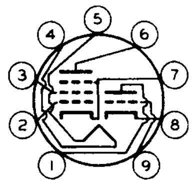
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## MEDIUM-MU TRIODE— SHARP-CUTOFF PENTODE

Bulb . . . . . . . . . . . . . . . . . . . . . . . . T6-1/2
Base . . . . . . . . . Small-Button Noval 9-Pin (JETEC No.E9-1)
Basing Designation for BOTTOM VIEW . . . . . . . . . . . 9AE

Pin 1 - Triode Plate
Pin 2 - Pentode Grid No.1
Pin 3 - Pentode Grid No.2
Pin 4 - Heater
Pin 5 - Heater
Pin 6 - Pentode Plate




Pin 7 - Pentode Cathode, Pentode Grid No.3, Internal Shield
Pin 8 - Triode Cathode
Pin 9 - Triode Grid

### AMPLIFIER — Class $A_1$

**Maximum Ratings,** *Absolute Values:*

| | *Triode Unit* | *Pentode Unit* | |
|---|---|---|---|
| PLATE VOLTAGE . . . . . . . . . | 300 max. | 300 max. | volts |
| GRID-No.2 (SCREEN-GRID) SUPPLY VOLTAGE . . . . . . . . | - | 300 max. | volts |
| GRID-No.2 VOLTAGE . . . . . . . | - | *See Grid-No.2 Input Rating Chart at front of Receiving Tube Section* | |
| GRID-No.1 (CONTROL-GRID) VOLTAGE: | | | |
| Positive-bias value . . . . . | 0 max. | 0 max. | volts |
| GRID-No.2 INPUT: | | | |
| For grid-No.2 voltages up to 150 volts . . . . . . . . . | - | 0.5 max. | watt |
| For grid-No.2 voltages between 150 and 300 volts . | - | *See Grid-No.2 Input Rating Chart at front of Receiving Tube Section* | |
| PLATE DISSIPATION . . . . . . . | 2.5 max. | 2.8 max. | watts |
| PEAK HEATER-CATHODE VOLTAGE: | | | |
| Heater negative with respect to cathode . . . . . | 120 max. | 120 max. | volts |
| Heater positive with respect to cathode . . . . . | 120 max. | 120 max. | volts |

**Maximum Circuit Values:**

| | *Triode Unit* | *Pentode Unit* | |
|---|---|---|---|
| Grid-No.1-Circuit Resistance: | | | |
| For fixed-bias operation . . . | 0.5 max. | 0.5 max. | megohm |
| For cathode-bias operation . . | 1 max. | 1 max. | megohm |

○ With external shield JETEC No.315 connected to cathode of unit under test except as noted.

● With external shield JETEC No.315 connected to ground.


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## MEDIUM-MU TRIODE— SHARP-CUTOFF PENTODE

### CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

| | *Note* | *Min.* | *Max.* | |
|---|---|---|---|---|
| Heater Current | 1 | 0.179 | 0.211 | amp |
| Transconductance (Triode unit) | 1,2 | 6800 | 10200 | µmhos |
| Plate Current (Triode unit) | 1,3 | 12.7 | 23.3 | ma |
| Transconductance (Pentode unit) | 1,4 | 3900 | 6500 | µmhos |
| Plate Current (Pentode unit) | 1,5 | 7.5 | 12.5 | ma |
| Grid-No.2 Current (Pentode unit) | 1,5 | 2.2 | 4.8 | ma |
| Reverse Grid-No.1 Current (Total—both units) | 1,6 | – | -1.5 | µa |
| Heater-Cathode Leakage Current (Each unit): | | | | |
| Heater negative with respect to cathode | 1,7 | – | 5 | µa |
| Heater positive with respect to cathode | 1,7 | – | 5 | µa |
| Leakage Resistance (Each unit): | | | | |
| Between grid No.1 and all other electrodes of both units tied together | 1,8 | 50 | – | megohms |
| Between plate and all other electrodes of both units tied together | 1,9 | 50 | – | megohms |

Note 1: With ac or dc heater volts = 13.5.

Note 2: With dc plate-supply volts = 150, cathode resistor (ohms) = 56, and cathode-bypass capacitor (µf) = 1000.

Note 3: With dc plate-supply volts = 150, and cathode resistor (ohms) = 56.

Note 4: With dc plate-supply volts = 250, grid-No.2 supply volts = 110, cathode resistor (ohms) = 68, and cathode-bypass capacitor (µf) = 1000.

Note 5: With dc plate-supply volts = 250, grid-No.2 supply volts = 110, and cathode resistor (ohms) = 68.

Note 6: With triode dc plate volts = 150, pentode dc plate volts = 250, grid-No.2 volts = 110, grid-No.1 volts = -1.5 on both units, and grid-No.1 resistor (megohms) = 0.5 for each unit.

Note 7: With 50 volts dc between heater and cathode.

Note 8: With grid No.1 100 volts negative with respect to all other electrodes of both units tied together.

Note 9: With plate 300 volts negative with respect to all other electrodes of both units tied together.

### SPECIAL RATINGS & PERFORMANCE DATA

**Heater-Cycling Life Performance:**

This test is performed on a sample lot of tubes from each production run. A minimum of 2000 cycles of intermittent operation is applied under the following conditions: heater volts = 17 cycled one minute on and four minutes off, heater 135 volts negative with respect to cathode, and all other elements connected to ground. At the end of this test, tubes are checked for heater-cathode shorts and open circuits.

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## MEDIUM-MU TRIODE—SHARP-CUTOFF PENTODE

**Low-Frequency Vibration Performance:**

This test is performed on a sample lot of tubes from each production run under the following conditions:

*Triode Unit:*

Heater volts = 13.5, plate-supply volts = 150, grid volts = -1.5, plate load resistor (ohms) = 2000, and vibrational acceleration of 2.5 g at 25 cps. In this test, the rms output voltage must not exceed 150 millivolts.

*Pentode Unit:*

Heater volts = 13.5, plate-supply volts = 250, grid-No.2 volts = 110, grid-No.1 volts = -1.5, plate load resistor (ohms) = 2000, and vibrational acceleration of 2.5 g at 25 cps. In this test, the rms output voltage must not exceed 250 millivolts.

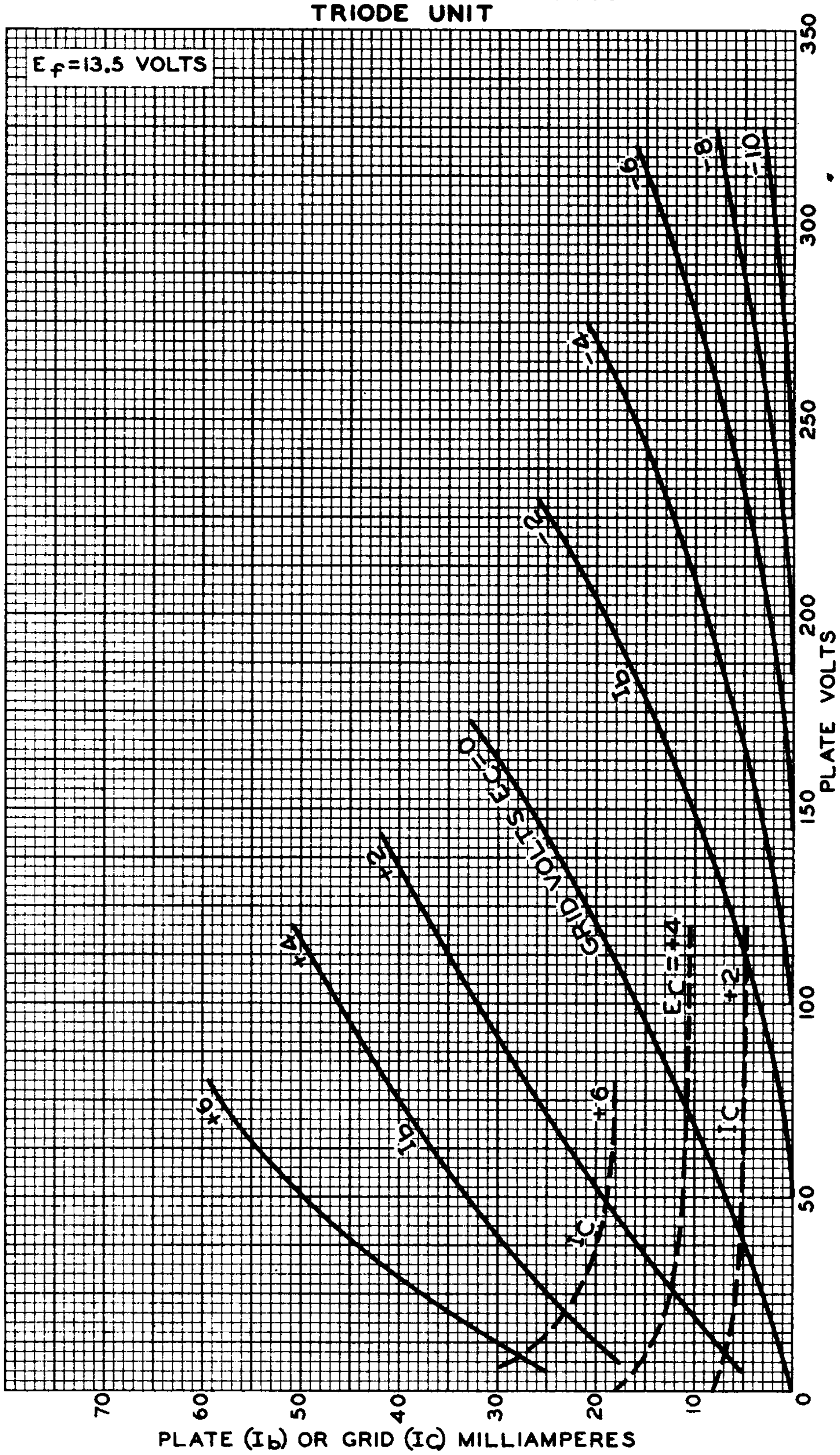
**500-Hour Intermittent Life Performance:**

This test is performed on a sample lot of tubes from each production run to insure high quality of the individual tube and to guard against epidemic failures. Life testing is conducted under the following conditions: heater volts = 15 and maximum-rated plate dissipation and grid-No.2 input.

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## AVERAGE CHARACTERISTICS
### TRIODE UNIT



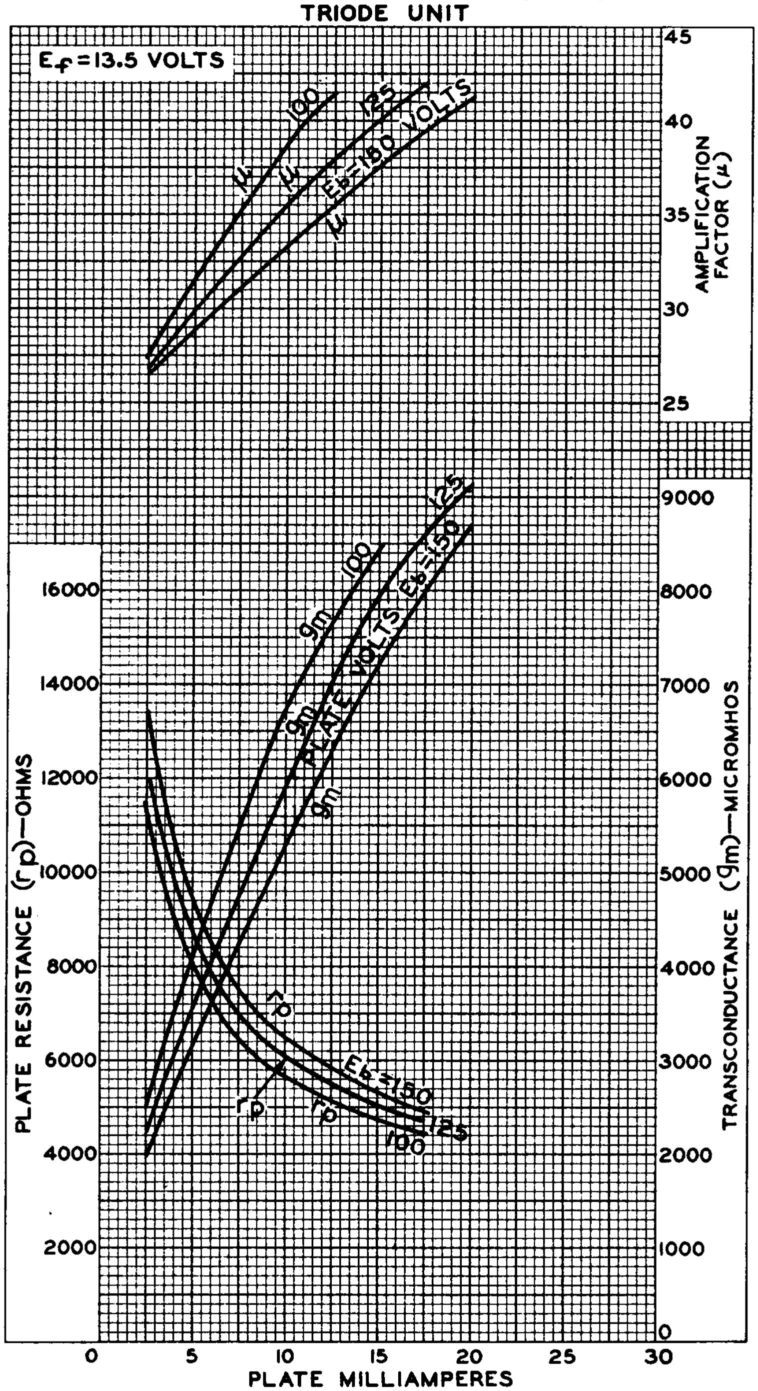

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# AVERAGE CHARACTERISTICS
## TRIODE UNIT



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# AVERAGE CHARACTERISTICS
## PENTODE UNIT

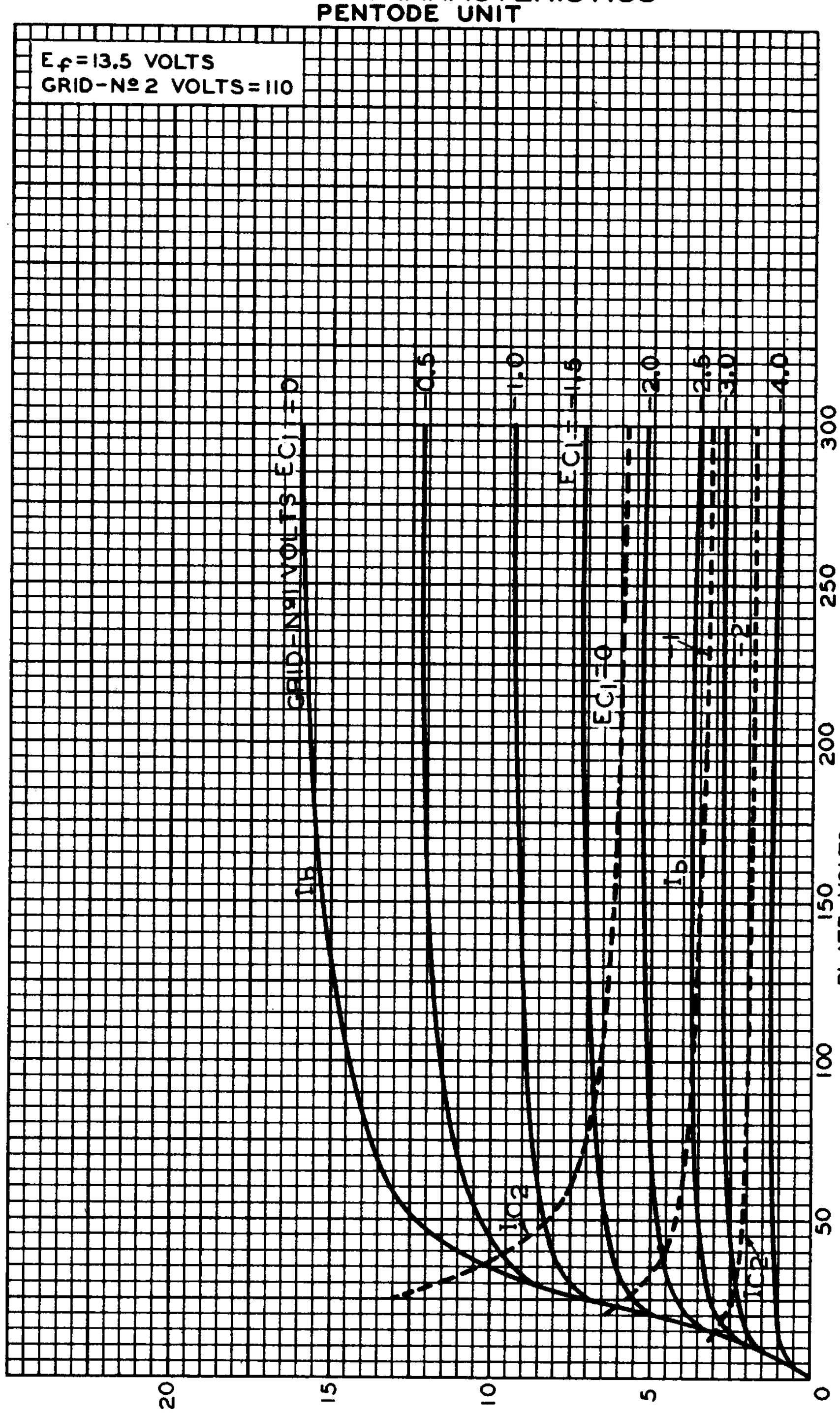



PLATE ($I_b$) OR GRID-No2 ($I_{C2}$) MILLIAMPERES

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